NORTH AMERICA.

By A. J. HENRY, Meteorologist.

In the United States and adjacent parts of Canada and Mexico the month, as a whole, was of the mild type of winter weather, there being an absence of the usual sharp changes to cold weather characteristic of the month.

The present winter, therefore, stands in sharp contrast to that of the preceding year. The obvious explanation seems to be that the ridge of high presure in cold winters that joins the Siberian High to the Continental High of North America was absent and, as has been previously stated, pressure was relatively low over Alaska and the Canadian Northwest.

NORTH ATLANTIC OCEAN.

By F. A. YOUNG.

The atmospheric conditions over the North Atlantic Ocean, for the month under discussion, presented unusual features. While not enough vessel reports were received in time to determine the mean monthly pressure over different sections of the ocean, the observations made at a number of land stations show that in the vicinity of the Azores, Bermuda, and along the American coast from Newfoundland to the Gulf of Mexico, the average pressure was below the normal, the greatest departure occurring at Horta, Azores, where the monthly mean was 29.73 inches, the normal being 30.10. This reversal of the usual conditions was responsible for exceptionally severe weather in the region south of the 40th parallel, while over the northern steamer lanes gales were unusually prevalent, and the "westerlies" that can ordinarily be depended on in that region were replaced, during a large part of the month, by winds from the easterly quadrants.

On February 1 strong southeasterly gales of a maximum force of 65 miles an hour, accompanied by "hail" and snow, prevailed over the region between the 30th meridian and the Irish coast, and on the same date westerly winds of gale force were encountered near the 40th parallel and 60th meridian.

The European disturbance moved rapidly eastward, as on the 2d moderate winds were the rule over the storm area of the day before, the same conditions holding true, for the most part, in the waters adjacent to the American coast. On the 3d moderate gales were reported from a limited area between the 38th meridian and the Azores. From the 4th to the 6th the atmospheric circulation was comparatively stagnant, with light to variable winds prevailing over practically the entire ocean. On the 7th the barometric reading at Horta, Azores, was 29.34 inches, being a fall of over half an inch since the previous day; a few reports were received from vessels in widely scattered sections of the ocean, denoting winds of gale force, although comparatively moderate weather prevailed in the vicinity of the Azores. By the 8th the barometer at Horta had fallen to 28.96 inches, accompanied by southeasterly gales of over 50 miles an hour, while the greater part of the region between that locality and the Bermudas was storm swept, and strong northeasterly gales were also encountered off the Irish coast. The storm center moved about 5 degrees toward the north during the next 24 hours, and on the 9th the greater part of the steamer lanes east of the 30th meridian was swept by moderate to strong gales, while unusually heavy weather for the latitude was also reported south of the Azores. During the next 24 hours there was apparently little change in the position and intensity of the disturbance, except that on the 10th no gales were reported over the eastern section of the ocean south of the 40th parallel, and a second LOW had formed near the Bermudas, which afterwards developed into an unusually severe storm. This disturbance shifted slowly northward, and reached its greatest intensity on the 11th when the center was near latitude 40, longitude 52; northwest winds of hurricane force, accompanied by snow, prevailed, with a minimum barometric reading of 28.80 inches, while the storm area extended fron the 30th to the 45th parallels and from the 45th to the 63d meridians. The eastern LOW of the 10th had moved but slghtly and decreased somewhat in intensity, although practically the entire ocean west of the 20th meridian was swept by gales. By the 12th the western disturbance had drifted slightly northward, and the center was now not far from St. Johns, N. F.; westerly winds of over 50 miles an hour, with "hail" and snow, were still encountered over the area between the 35th and 47th parallels, and the 45th and 60th meridians. During the next 24 hours this LOW moved but slightly and decreased in violence, although a few reports were received showing that on the 13th there were moderate gales over the western portion of the steamer lanes. The disturbance shifted slowly eastward, reaching the European coast on the 18th, when moderate southeast gales were recorded.

On the 17th a fairly well developed LOW was central near latitude 40, longitude 55, and westerly winds of about 40 miles an hour were encountered by a number of vessels between the center and the American coast. Moving slowly eastward, by the 19th, the center had reached a point near latitude 45, longitude 47, where the barometer reading was 28.82 inches, and at the same time there was a HIGH with a crest of 30.40 inches near Hatteras. Westerly gales of from 40 to 50 miles an hour prevailed in the vicinity of the LOW, while the anemometer at New York registered a northwesterly gale of nearly 60 miles an hour, the barometer reading 30.22 inches. On the 20th the center of the LOW was near latitude 45, longitude 38, and the HIGH near Norfolk, Va. Moderate gales with snow occurred off the coast of Newfoundland and vessels in the vicinity of the Bermudas encountered northerly winds of over 40 miles an hour. On the 23d there was a disturbance about half way between the Azores and the Irish coast; easterly winds of 40 miles an hour prevailed in the northern quadrants, while westerly gales of greater velocity were reported a short distance south of the center.

On the 24th a LOW was central near Halifax, N. S., and strong easterly gales with snow swept the south coast of Newfoundland, while westerly winds of somewhat less force were reported from the waters adjacent to the New England coast, practically the same conditions existing also on the 25th.

During the remainder of the month there were no well-defined storm areas, although a number of reports were received from vessels in the western division of the ocean, that encountered moderate gales.

The following is an extract from a very interesting letter received from the commanding officer of the U. S. S. *Charleston:*

1. Forwarded herewith are inclosures descriptive of the storm, apparently an extra-tropical cyclone, of the recurving type, encountered by the U. S. S. *Charleston* on February 10–11, 1919, about 200 miles east of Bermuda in latitude 32–20 N., longitude 60 W.

2. It is noted that the S. S. *Accoma* was abandoned in about latitude 36–30 N., longitude 62–40 W., at noon on February 11, after evidently having encountered the storm herein described. Attention is invited to the fact that from our plotting of the storm track the *Accoma* was nearest the storm center at 6 p. m., February 10.

According to the dates furnished, the *Charleston* was apparently some distance south of the center, during the period from 8 p. m. on the 10th to 2 a. m. on the 11th, when westerly winds of over 70 miles an hour prevailed and waves of from 50 to 60 feet in height did considerable damage to the ship. The lowest barometer 29.19 inches occurred from 8 to 9 p. m. on the 10th, the pressure then rising slowly, and the wind gradually diminishing in force, although moderate northwesterly gales prevailing until noon of February 11.

A letter was also received from the commanding officer of the U. S. S. *Antigone* that referred to the same storm. The *Antigone* was some distance north of the position of the *Charleston*, when the gale was at its height, and therefore nearer the center. Extracts from the letter are as follows:

On February 6, about noon, we passed close to the Azores and shortly after leaving the islands the barometer started to fall and the wind to increase in force from the southwest quadrant. The barometer fell until it reached 29.14 inches at 3 a. m. February 7, the wind blowing with a force of from 8 to 9, with moderate sea. At 4 a. m. the wind suddenly shifted to the northwest, the weather cleared, and the wind moderated to force 4 or 5, gradually backing around to the southwest. Barometer rose only slightly on the 7th.

On February 8 the barometer continued very low, with strong northwesterly winds, and moderated on the 9th, the barometer rising as high as 29.97 on the afternoon of the 9th. After midnight on that date it started to fall rapidly and gave signs of an approaching gale, although the barometer had been steadily low, as shown. There was no accompanying swell, nor was there much wind, which was in the southwest quadrant.

February 10, near midnight, the wind began to increase rapidly, the sea picked up materially, and the barometer fell at the rate of about one-tenth of an inch per hour, the wind coming from the west and southwest quadrants. Between 2 and 3 a. m. on the 11th the blow seemed to be at its height. The sea was very rough, the waves being from 30 to 50 feet in height, and it became necessary to heave to with the wind on the bow, as several lifeboats had been stove in, and it was not advisable to risk shipping a sea, loaded as we were with troops. At 5 a. m. the barometer reached its lowest point, 28.53 inches, then rose slightly and remained practically stationary for two hours, the wind and sea being exceptionally heavy. At 6 p. m. the wind began to haul gradually to the westward, and later the barometer started up slowly, then moved rapidly, rising on the average at a rate of about 0.12 inch per hour up to noon, the wind and sea moderating slightly.

When the effect of the wind from the northwest began to be felt a very disagreeable, choppy cross sea was the result. This condition lasted through February 12, the wind continuing strong from the northwest quarter.

On February 11 intercepted messages were received from the steamships *Mumwood* and *Cape Henry*, which gave the height of the barometer at this position. These positions and barometer readings, together with that of the *Antigone* at the same time, follow:

February 11, 3 hours, 42 minutes G. M. T., S. S. *Mumwood* in latitude 34–14 N., longitude 52–09 W., barometer, 29.47 inches.

February 11, 3 hours, 34 minutes G. M. T., S. S. *Cape Henry* in latitude 36–30 N., longitude 50–00 N., barometer 29.26 inches.

February 11, 3 hours, 49 minutes G. M. T., U. S. S. *Antigone* in latitude 37–21, longitude 53–45, barometer 29.18 inches.

The lowest barometer was experienced by the *Antigone* in latitude 27–15 N., longitude 55 W., 20 hours, 46 minutes G. M. T., barometer 28.53 inches.

It is thought that the center of this storm passed very close to the *Antigone*, and to the northward of us, between 2 and 5 a. m., February 11. During that time the barometer reached the lowest point and the wind blew with hurricane force, seas very high though regular, and all around the ship there was a heavy bank of clouds with continuous lightning. Directly overhead the sky was clear nearly all the time, the stars being clearly seen. In other words, the ship seemed to be in a pocket surrounded by heavy clouds, the limits of the horizon being only a mile or two from the ship, as could be seen during the flashes of lightning.

NOTES ON WEATHER IN OTHER PARTS OF THE WORLD.

BRITISH ISLES.

The predominant character of the weather over the British Isles since the commencement of the year has been rainy and dull * * *. February rainfall was in excess of the average in the south and east of England and deficient elsewhere. The general rainfall expressed as a percentage of the average was: England and Wales, 103; Scotland, 38; Ireland, 69; British Isles, 71. The aggregate duration of bright sunshine * * * has been deficient in all districts of the British Isles except in Ireland and in Scotland north; in the southeast district of England the deficiency amounts to 0.6 hour daily for the first nine weeks [of the year], or, in all, 38 hours. At Kew Observatory the sunshine in February was little more than one-half of the average, and at Cambridge it was less than one-half of the normal. In mid February the weather was cold enough for skating in nearly all districts. The month as a whole was cold, the mean temperature was 35°.6 being 4°.1 below the average, and 2°.2 lower than in January.—From Nature, London, Mar. 13, 1919, pp. 30–31; and Symons's Met'l. Mag., Mar., 1919, p. 21.

DETAILS OF THE WEATHER IN THE UNITED STATES, FEBRUARY, 1919.

CYCLONES AND ANTICYCLONES.

By ALFRED J. HENRY, Meteorologist.

Cyclones.—Eleven cyclones have been plotted on Chart III, distributed according to place of origin or first appearance on the daily weather maps as follows: North Pacific 6, South Pacific 2, and Alberta 3. The North Pacific cyclone which appeared off the Washington coast on the morning of the 10th moved thence southeastward across the Plateau and Rocky Mountain regions, pressure at the center, diminishing until on the morning of the 13th when it reached the low value of 28.90 inches at Kansas City, Mo. At this time the surface air over practically the entire area of the United States east of the Rocky Mountains was in cyclonic circulation about the center of the whirl. As the cyclone moved eastward several minor cyclonic systems developed within the greater primary cyclone. The latter passed off to sea over Newfoundland on the 17th.

Anticyclones.—Although pressure was below normal over Alaska and the Canadian Northwest, 6 HIGHS have been plotted as originating in Alberta, 1 in the Hudson Bay region, and 3 apparently moved into the continent from the Pacific. The HIGHS presented no unusual features.

THE WEATHER ELEMENTS.

By P. C. DAY, Climatologist and Chief of Division.

[Dated Weather Bureau, Washington, Apr. 1, 1919.]

PRESSURE AND WINDS.

The distribution of the mean atmospheric pressure over the United States and Canada and the prevailing direction of the winds for February, 1919, are graphi-